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EXAMINER

BELLO, AGUSTIN

ART UNIT PAPER NUMBER

2613

DATE MAILED: 08/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/676,450

Applicant(s)

JOHNSON ET AL.

Examiner

Agustin Bello

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-11 is/are rejected.
- 7) ☒ Claim(s) 5 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>10/18/04</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Claims 1 and 11 recite the limitation "said delayed encoded user data channels" in lines 5 and 6, respectively. There is insufficient antecedent basis for this limitation in the claims.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 2, 6, 10, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Britz (U.S. Patent No. 6,731,878) in view of Tsujimoto (U.S. Patent No. 6,556,617).

Regarding claim 1 and 11, Britz teaches encoding user input data with a FEC (reference numeral 162 in Figure 5) to produce encoded user data; producing a plurality of encode user data channels from said encoded user data (e.g. output of each of reference numeral 166 in Figure 5), wherein each particular channel of said delayed encoded user data channels comprises a unique delay relative to all of the other channels of said plurality of encoded user data channels (reference numeral 56 in Figure 2); a step for transmitting said plurality of encoded user data

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channels across a free space optical channel (reference numeral 58 in Figure 2); a step for receiving said plurality of encode user data channels and separating each channel from said plurality of encoded user data channels (reference numeral 62, 64 in Figure 2); detecting each said plurality of received beams (reference numeral 68, 69 in Figure 2); adjusting selected ones of said received beams so all of them are temporally equal (reference numeral 66 in Figure 2); and sending the first successfully decoded received beam as a recovered user data output (reference numeral 70 in Figure 2). Britz differs from the claimed invention in that Britz fails to specifically teach decoding said received beams. However, being that Britz encodes the data before transmission, Britz suggest the ability to decode the data at the receiving end.

Furthermore, Tsujimoto discloses that encoding and decoding of wireless electromagnetic radiation is well known in the art (reference numerals 101 in Figure 3 and reference numeral 119 in Figure 4). One skilled in the art would have been motivated to employ a decoder at the receiving station as taught by Tsujimoto in order to allow recovery of the user data output. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to include a decoder in the device of Britz as taught by Tsujimoto.

Regarding claim 2, the combination of Britz and Tsujimoto teaches that the step for transmitting said plurality of encode user data channels across a free space optical channel comprises modulating said plurality of encoded user data channels with a modulation scheme selected from the group consisting of amplitude modulation, frequency modulation and phase modulation (amplitude modulation inherent in the direct modulation of lasers 166 in Figure 5 of Britz; reference numeral 105 in Figure 5 of Tsujimoto).

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Regarding claim 6, the combination of Britz and Tsujimoto teaches that said FEC includes forward error correcting codes that select viable received channels from a set of diversity delayed channels (inherent in the FEC of both Britz and Tsujimoto).

Regarding claim 10, the combination of references teaches that the method is protocol independent (inherent in the free space optical communications).

6. Claims 3, 7, 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Britz and Tsujimoto as applied to claim 1 above, and further in view of Izadpanah (U.S. Patent Application Publication No. 2003/0002100).

Regarding claim 3, the combination of Britz and Tsujimoto teaches that the step for transmitting said plurality of encoded user data channels across a free space optical channel comprises: driving a separate wavelength division multiplexing laser with each channel of said plurality of encoded user data channels (reference numeral 166 in Figure 5 of Britz), wherein each laser produces an output beam that operates as a carrier of the encoded user data information in a particular channel of said plurality of encode user data channels; combining all of the output beams in a wavelength division multiplexing multiplexer (WDM-MUX) to produce a combined beam; and transmitting said combined beam across said free-space optical channel, wherein said step for receiving said plurality of encoded user data channels and separating each channel from said plurality of encoded user data channels comprises: separating said combined beam into a plurality of received beams, wherein each received beam corresponds to a particular output beam of particular said laser. The combination of Britz and Tsujimoto differs from the claimed invention in that it fails to specifically teach an ultra-dense wavelength division multiplexed format. However, Izadpanah in the same field of wireless optical communication

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teaches that ultra-dense wavelength division multiplexing the free-space domain is well known in the art (paragraph [0002] of Izadpanah). One skilled in the art would have been motivated to employ ultra-dense wavelength division multiplexing in order to provide substantially more channels (paragraph [0002] of Izadpanah). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to employ ultra-dense wavelength division multiplexing in the device of the combination of Britz and Tsujimoto.

Regarding claim 7, the combination of references and Izadpanah in particular teaches that the step for transmitting said plurality of encoded user data channels across a free space optical channel includes modulating said plurality of encoded user data channels with high-order modulation ("PSK" of paragraph [0044]).

Regarding claim 8, the combination of references and Izadpanah in particular teaches that the step for transmitting said plurality of encoded user data channels across a free space optical channel includes arbitrary combinations of ultra dense wavelength division multiplexing and high-order modulation of said plurality of encoded user data channels (paragraph [0044]).

7. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Britz, Tsujimoto, and Izadpanah as applied to claim 3 above, and further in view of Puc (U.S. Patent No. 6,341,023).

Regarding claim 4, the combination of Britz, Tsujimoto, and Izadpanah differs from the claimed invention in that it fails to specifically teach in a M-ary phase shift keying (PSK) encoder' PSK encoding each said particular channel to combine a plurality of PSK encoded channels in a PSK transmission channel; driving an optical phase modulator (OPM) with said PSK transmission channel; modulating an UDWDM laser with said OPM to produce an OPM

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channel, and in a M-ary optical phase decoder, decoding said transmitted beam into a plurality of received beams, wherein each received beam corresponds to a particular channel of said delayed encoded user data channels. However, Puc in the same field of optical communication teaches that M-ary PSK is well known in the art (see Figure 2). One skilled in the art would have been motivated to employ M-ary PSK in order to provide modulation gain (column 2 lines 39-52). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to employ M-ary PSK in the device of the combination of references.

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Britz and Tsujimoto as applied to claim 1 above, and further in view of Haven (U.S. Patent No. 3,875,534).

The combination of Britz and Tsujimoto differs from the claimed invention in that it fails to specifically teach that the number of diverse channels and the lengths of the delays are dynamically reconfigurable. However, Haven in the same field of optical communication, teaches that this concept is well known in the art (column 1 lines 54 – column 2 line 15). Furthermore, Britz suggests the ability to include more channels than shown in the reference. One skilled in the art would have been motivated to include more diverse channels and reconfigurable delays in order to increase the possibility of reception of the transmitted data. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to allow the number of diverse channels and delays to be dynamically reconfigurable.

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Allowable Subject Matter


9. Claim 5 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Agustin Bello whose telephone number is (571) 272-3026. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571)272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Agustin Bello
Primary Examiner
Art Unit 2613

AB